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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/426,644	10/25/1999	JAE-HO MOON	1349.1022/MD	2168

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EXAMINER

TUGBANG, ANTHONY D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 01/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/426,644

Applicant(s)

MOON ET AL.

Examiner

Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 November 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,13-17,19,21,23,24,27,30,38,40 and 42 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

- 5) ☒ Claim(s) 13-16,21,24,27,30 and 42 is/are allowed.

- 6) ☒ Claim(s) 1,2,17,19,23,38 and 40 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/25/02 has been entered.

### ***Election/Restrictions***

2. In response to the applicants' arguments filed 10/21/02 (Paper No. 21, pages 3 and 4) drawn to Species B in the previous Office Action, these arguments are now considered to be moot in light of the fact that non-elected Claims 31, 44, 45 and 47 have been cancelled.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campanelli 4,878,992 and Hawkins et al Re. 32,572 (referred to hereinafter as Hawkins'572) in view of Hawkins et al 5,006,202 (referred to hereinafter as Hawkins'202).

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Regarding Claim 1, Campanelli discloses the claimed manufacturing method comprising: forming a nozzle part (channel plate 31); adhering a membrane (polymer layer 58) to the formed nozzle part 31 and a heat driving part (heating element wafer 36) to form the fluid jetting apparatuses as a wafer (shown in Fig. 1), which will eventually be separated into individual fluid jetting apparatuses. Insofar as understood, the wafer (shown in Fig. 1) of Campanelli comprising the membrane 58, nozzle part 31 and heat driving part 36 are considered to be a shape of an undivided wafer to the extent that they are integrally attached to one another prior to being split by the dicing blade 20. The heat driving part 36 includes fluid chambers (through hole 35) and the membrane 58 surrounds or separates the fluid chambers 35 of the heat driving part from the nozzle part 31 (shown in Figures 5 and 6).

NOTE: Hawkins'572 is incorporated by reference within the disclosure of Campanelli (see Campanelli at col. 4, lines 65-67).

Regarding Claim 2, Hawkins'572 teaches forming electrodes 33 and heating elements 34 on a first substrate of a silicon wafer 36 (shown in Fig. 5); and forming driving fluid barriers (upper substrate 31) on top of the electrodes 33 and the heating elements 34.

Regarding Claim 38, Campanelli further teaches splitting of the nozzle part, heat driving part and membrane, assembled together in the form of the wafer (shown in Fig. 2) by a dicing blade 20 (shown in Fig. 3) to form separate fluid jetting apparatuses.

Neither Campanelli nor Hawkins'572 teaches forming the nozzle part by a spinning process.

Hawkins'202 teaches forming a nozzle part (channel plate 12 in Fig. 16) by a spinning process of spin coating layers of photoresists to etch and shape the nozzle part (see col. 6, lines

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12-42). The benefits of such a spinning process leaves a precision, etched nozzle part ready to be separated into multiple fluid jetting apparatuses (see col. 3, lines 65-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle part of either Campanelli or Hawkins'572 by the spinning process of Hawkins'202, to positively provide a precision, etched nozzle part ready to be separated into multiple fluid jetting apparatuses.

5. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leban 5,229,785 in view of Baise et al 4,371,565.

Regarding Claim 17, Leban discloses the claimed manufacturing method for a plurality of fluid jetting apparatuses comprising: forming a nozzle part on a wafer (dummy substrate 10) by a spinning process (see col. 4, lines 56-60); adhering the nozzle part with the wafer to a membrane (barrier layer 22); removing the wafer 10 from the nozzle part (see Fig. 1H); and adhering the membrane 22 with the adhered nozzle part (shown in Fig. 1G) to a heat driving part (heater element 36 and substrate 34) to form the fluid jetting apparatuses (see col. 7, lines 43-48). The nozzle part, membrane and heat driving part are formed as an undivided unit (as shown in either one of Figures 1H, 2B or 4).

Regarding Claim 19, Leban further teaches the following: forming a nozzle plate 14 as part of the nozzle part on a first substrate 34 in which both of the elements constitute the nozzle part; forming driving fluid barriers (photoresists 12 in Fig. 1G) on the nozzle plate; forming jetting fluid chambers 32 within the jetting fluid barriers; forming a first reinforcement element (additional layer 52 shown in the embodiment of Fig. 3C); and forming nozzles 20 in the nozzle plate. The claimed "spinning process" of Leban is broadly encompassed by the nozzle plate 14

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of the nozzle part being formed by a coating technique of *spinning* or spraying (discussed at col. 4, lines 56-61) together with the fluid jetting barriers 12.

Leban does not teach that the wafer is made of the material of silicon.

Baise teaches that it is known in the art of spinning processes, i.e. spin coatings, to form polymeric layers on a substrate wafer made of silicon material (see col. 1, lines 49-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle part material of Leban on a substrate wafer made of silicon material, as taught by Baise, for the purpose of performing an equivalent spinning process of spin coating.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leban in view of Baise, as applied to Claim 17 above, and further in view of Pan 4,894,664.

Leban, as modified by Baise, discloses the claimed manufacturing method as previously discussed including the step of forming electrodes (electrical conductors) and heat elements (heat resistors 36) on a substrate wafer 34 (see col. 5, line 60 to col. 6, line 5 of Leban). The modified Leban method does not teach that the substrate wafer is made of *silicon* material as well as the steps of forming driving fluid barriers on the electrodes and the heat elements, and forming driving fluid chambers in the driving fluid barriers.

Pan teaches a process of manufacturing a thermal fluid jetting apparatus of forming a heat driving part (substrates 40, 10) in which driving fluid barriers (beams 12) are formed on both electrodes (conductive layers 23, 27) and heat driving elements (resistive layers 15). The driving fluid chambers are read as the passageways in-between the driving fluid barriers (beams 12 shown in Fig. 3). The benefits of such a process above provides a fluid jetting apparatus with

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increased reliability with a longer life of heat driving elements and smoother ink flow (see col. 1, lines 48-52).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have improved the heat driving part of the modified Leban method by including the process of forming driving fluid barriers and driving fluid chambers, as taught by Pan, to positively provide an overall fluid jetting apparatus having increased reliability with a longer life of heat driving elements and smoother ink flow.

7. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leban in view of Baise, as applied to claim 17 above, and further in view of Campanelli.

Leban, as modified by Pan, teaches the claimed manufacturing method as previously discussed including the suggestion of forming a plurality of fluid jetting apparatuses (at col. 7, lines 43-48 of Leban). The modified Leban method does not teach splitting the adhered nozzle part, membrane, and heat driving part into separate fluid jetting apparatuses.

Campanelli, as relied upon above, teaches batch fabrication of a plurality fluid jetting apparatuses in which each fluid jetting apparatus is formed into a continuous wafer or continuous piece. Subsequently, Campanelli splits the continuous wafer or continuous piece into a plurality of fluid jetting apparatuses by utilizing a dicing blade to ultimately provide an inexpensive manufacturing process for creating high quality fluid jetting apparatuses (see col. 9, lines 8-12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have improved the modified Leban method by batch fabrication of the fluid jetting apparatuses, as taught by Campanelli, to positively provide an inexpensive manufacturing process for creating high quality fluid jetting apparatuses.

***Response to Arguments***

8. Applicant's arguments filed 10/21/02 (Paper No. 21) have been fully considered but they have not been deemed to be found as persuasive.

In regards to the merits of Campanelli and Hawkins as applied to the rejection of Claim 1, applicants appear to allege that neither teach that the chambers are in the heat driving part. With the heat driving part being read as heating element wafer 36 and the fluid chambers being read as the holes 35, the examiner's position is that the claims neither recite nor require that chambers be in the heat driving part. The claims do not preclude that the heat driving part can be formed on a separate layer or separate from the fluid chambers. The term "includes" (line 8 of Claim 1) is a very broad limitation and all that is required is "the heat driving part includes fluid chambers" (line 8), and Campanelli fully satisfies this limitation. It appears that the applicants are arguing more specifically than that which is claimed. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In regards to the merits of Leban as applied to the rejection of Claims 17, 19, 23 and 40, these arguments are now considered moot in view of barrier layer 22 being read as the membrane.

In regards to the merits of Pan, applicants contend that Pan does not teach that the electrodes and heating elements are formed on the bottom sides of the corresponding driving fluid chambers. The examiner traverses in that the claims still do not recite any relationship between bottom sides and top sides, especially any recitation relative to top sides. Thus, the location of the heating elements and electrodes of Pan can be said to be on the claimed "bottom



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sides of the corresponding driving fluid chambers, each of the bottom sides being between the corresponding pair of the driving fluid barriers". The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Therefore, the combination of Pan with Leban and Baise satisfies the limitations of Claim 23.

#### ***Allowable Subject Matter***

9. Claims 13-16, 21, 24, 27, 30 and 42 are allowed.

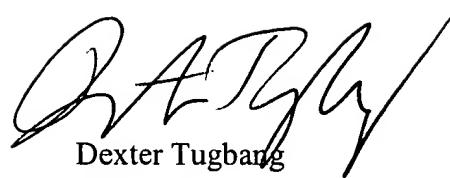
#### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3590 for regular communications and 703-305-3588 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.

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A handwritten signature in black ink, appearing to read 'Dexter Tugbang', with a long, sweeping horizontal stroke extending to the right.

Dexter Tugbang  
Examiner  
Art Unit 3729

adt

January 13, 2003